Stoller
Hanford Office

DOE-EM/GJ1223-2006

299-E28-86 (A6837)
Log Data Report

Borehole Information:

Borehole:	299-E28-86 (A6837)		Site:	216-B-62 Crib	
Coordinates (WA St Plane)		GWL[1] (ft) :	None	GWL Date:	12/15/05
North	East	Drill Date	Elevation (ft) (TOC)	Total Depth (ft)	Type
136,865.350	573,020.955	06/83	677.7	30	Cable

Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Welded steel	2.6	6 5/8	6	5/16	2.6	30

Borehole Notes:

Casing diameter and stickup measurements were acquired using a caliper and steel tape. Logging data acquisition is referenced to the top of casing (TOC).

Spectral Gamma Logging System (SGLS) Equipment Information:

Logging System:	Gamma 1N		Type:	SGLS (60%) SN: 45-TP22010A
Effective Calibration Date:	11/29/05	Calibration Reference:	DOE/EM-GJ1053-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

High Rate Logging System (HRLS) Equipment Information:

Logging System:	Gamma 1C		Type:	HRLS SN: 39-A314
Effective Calibration Date:	10/06/05	Calibration Reference:	DOE/EM-GJ1019-2005	
		Logging Procedure:	MAC-HGLP 1.6.5, Rev. 0	

Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3 Repeat		
Date	12/20/05	12/20/05	12/20/05		
Logging Engineer	Spatz	Spatz	Spatz		
Start Depth (ft)	31.0	23.0	14.0		
Finish Depth (ft)	23.0	13.0	3.0		
Count Time (sec)	100	20	100		
Live/Real	R	R	R		
Shield (Y/N)	N	N	N		

Log Run	1	2	3 Repeat		
MSA Interval (ft)	1.0	1.0	1.0		
ft/min	N/A[2]	N/A	N/A		
Pre-Verification	AN005CAB	AN005CAB	AN005CAB		
Start File	AN007000	AN007009	AN007020		
Finish File	AN007008	AN007019	AN007031		
Post-Verification	AN007CAA	AN007CAA	AN007CAA		
Depth Return Error (in.)	N/A	N/A	0.0		
Comments	No fine-gain adjustment	High-rate interval	No fine-gain adjustment. Repeat section.		

High Rate Logging System (HRLS) Log Run Information:

Log Run	4	5 Repeat			
Date	12/21/05	12/21/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	23.0	36.0			
Finish Depth (ft)	14.0	33.0			
Count Time (sec)	300	300			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	NA	NA			
Pre-Verification	AC150CAB	AC150CAB			
Start File	AC150000	AC150010			
Finish File	AC150009	AC150013			
Post-Verification	AC152CAA	AC152CAA			
Depth Return Error (in.)	N/A	0.0			
Comments	No fine gain adjustment made.	Repeat section.			

Logging Operation Notes:

Logging was conducted with a centralizer on the sonde for both SGLS and HRLS logging. Repeat sections were collected with the HRLS to evaluate the logging system's performance. Repeat data were not acquired with the SGLS due to time constraints.

Analysis Notes:

Analyst:	Pope	Date:	06/08/06	Reference:	GJO-HGLP 1.6.3, Rev. 0

Pre-run and post-run verifications for the logging systems were performed before and after the day's data acquisition. Acceptance criteria were met for the verification spectra for both logging systems.

SGLS and HRLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated using the EXCEL worksheet templates identified as G1NNov05.xls (SGLS) and G1COct05.xls (HRLS). A casing correction for 0.3125-in. thick casing was applied to the SGLS and HRLS data.

Results and Interpretations:

A continuous zone of ^{137}Cs was detected from 12 to 31 ft. A zone of high ^{137}Cs concentrations exists from approximately 15 to 22 ft. The maximum concentration is approximately 7,800 pCi/g at 20.0 ft. ^{137}Cs was also detected from 3 to 6 ft, and 8 to 9 ft at concentrations ranging from 23 pCi/g to just above the MDL[3] (approx. 0.1 to 0.2 pCi/g).

^{154}Eu was identified from 14 to 15 ft, at the top of the high-rate zone, with a maximum concentration at 15 ft of about 15 pCi/g. This measurement was acquired for 20 seconds, rather than the more usual 100 seconds, as part of the high-rate zone. Therefore, the measured count rate for this energy peak (1274.44 keV) must be considered less accurate than usual, which is reflected in the rather high analytical uncertainty of about ± 5.0 pCi/g. ^{154}Eu may exist at higher concentrations in the high-rate zone.

Westinghouse Hanford Company logged this borehole in 1994 with the Radionuclide Logging System (RLS). The ^{137}Cs concentrations determined by the RLS, and decayed to 2005, show good agreement with the current SGLS measurements, except from about 13 to 22 ft, where the 1994 log indicates substantially lower concentrations. This is likely a consequence of the RLS system's reaction to higher activity, and is therefore not an indication of additional influx of ^{137}Cs in this zone. ^{154}Eu concentrations determined by the RLS also show good agreement with the current SGLS measurements. ^{60}Co was identified in 1994, but not in the current SGLS log, in part due to decay, and perhaps also as a consequence of the short (20-second) count time through this zone. Comparison of gross gamma plots from 1994 and 2005 suggest no changes in the gamma profile of this borehole since at least 1994.

The repeat sections for the HRLS indicate good agreement for ^{137}Cs and gross-gamma.

List of Plots:

Man-Made Radionuclides
Natural Gamma Logs
Combination Plot
Total Gamma and Dead Time
SGLS/RLS Man-made Comparison
Total Gamma Logs
HRLS Repeat Section

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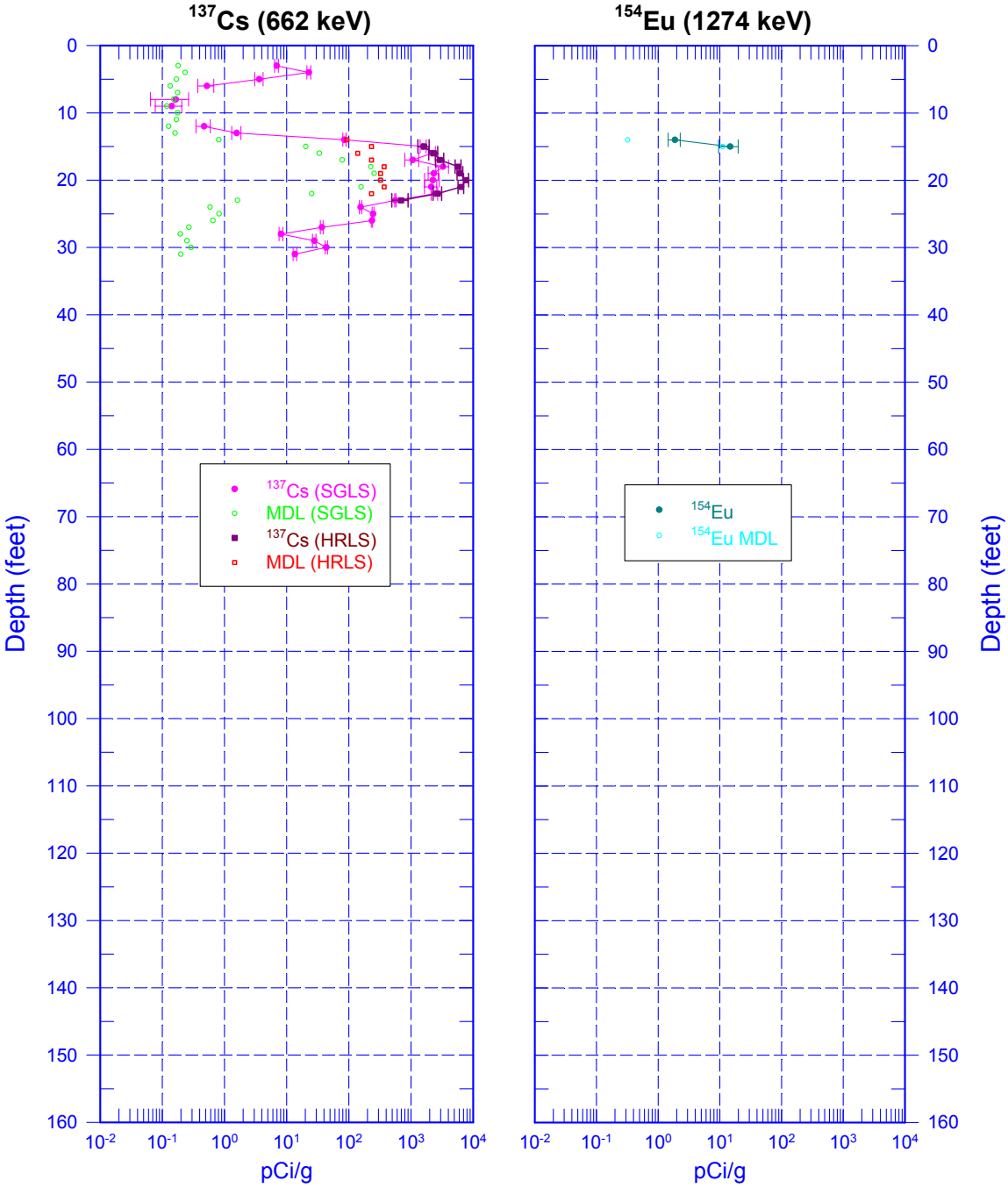
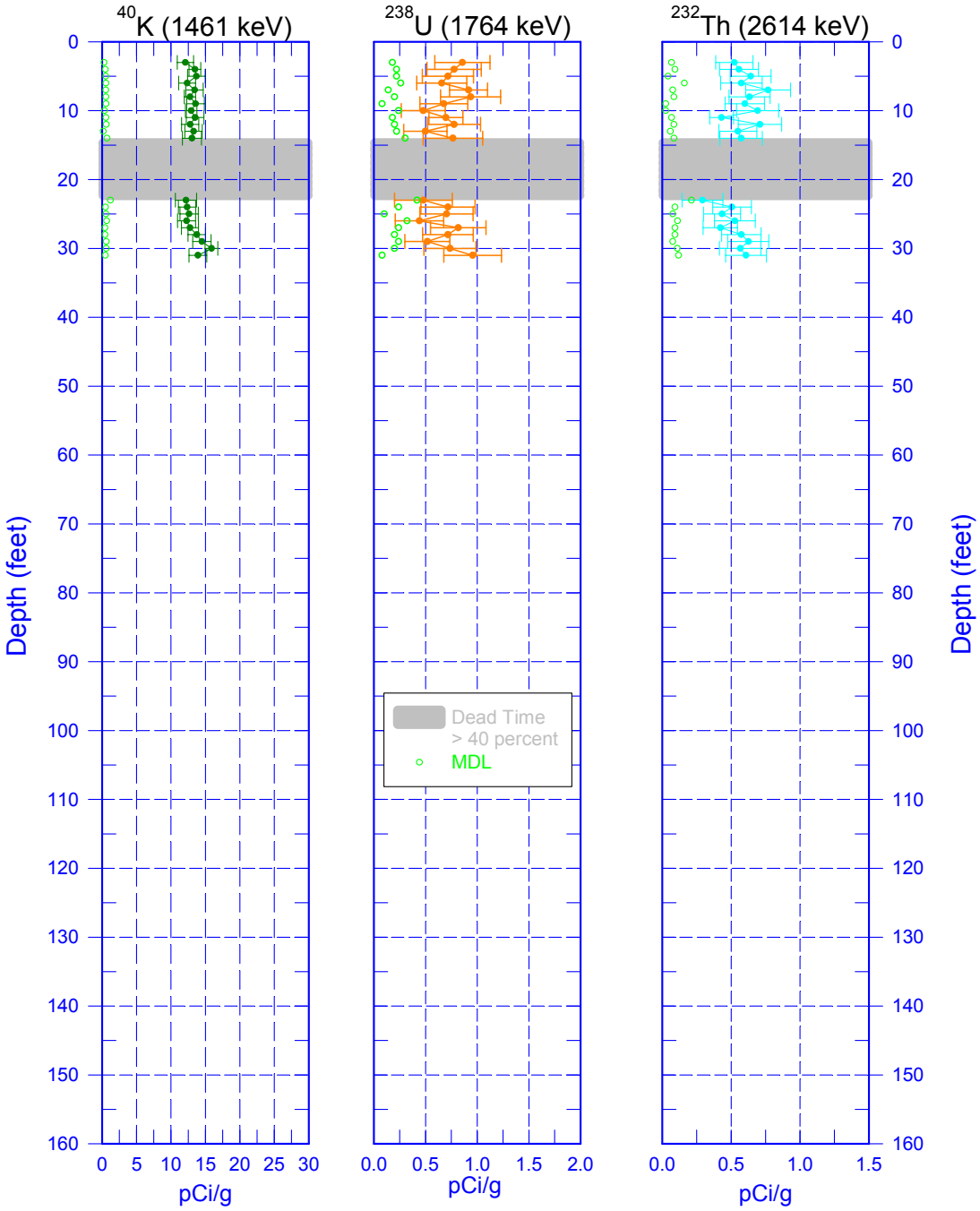
[1] GWL – groundwater level
[2] N/A – not applicable
[3] MDL – minimum detectable level

299-E28-86 (A6837)
Man-Made Radionuclides



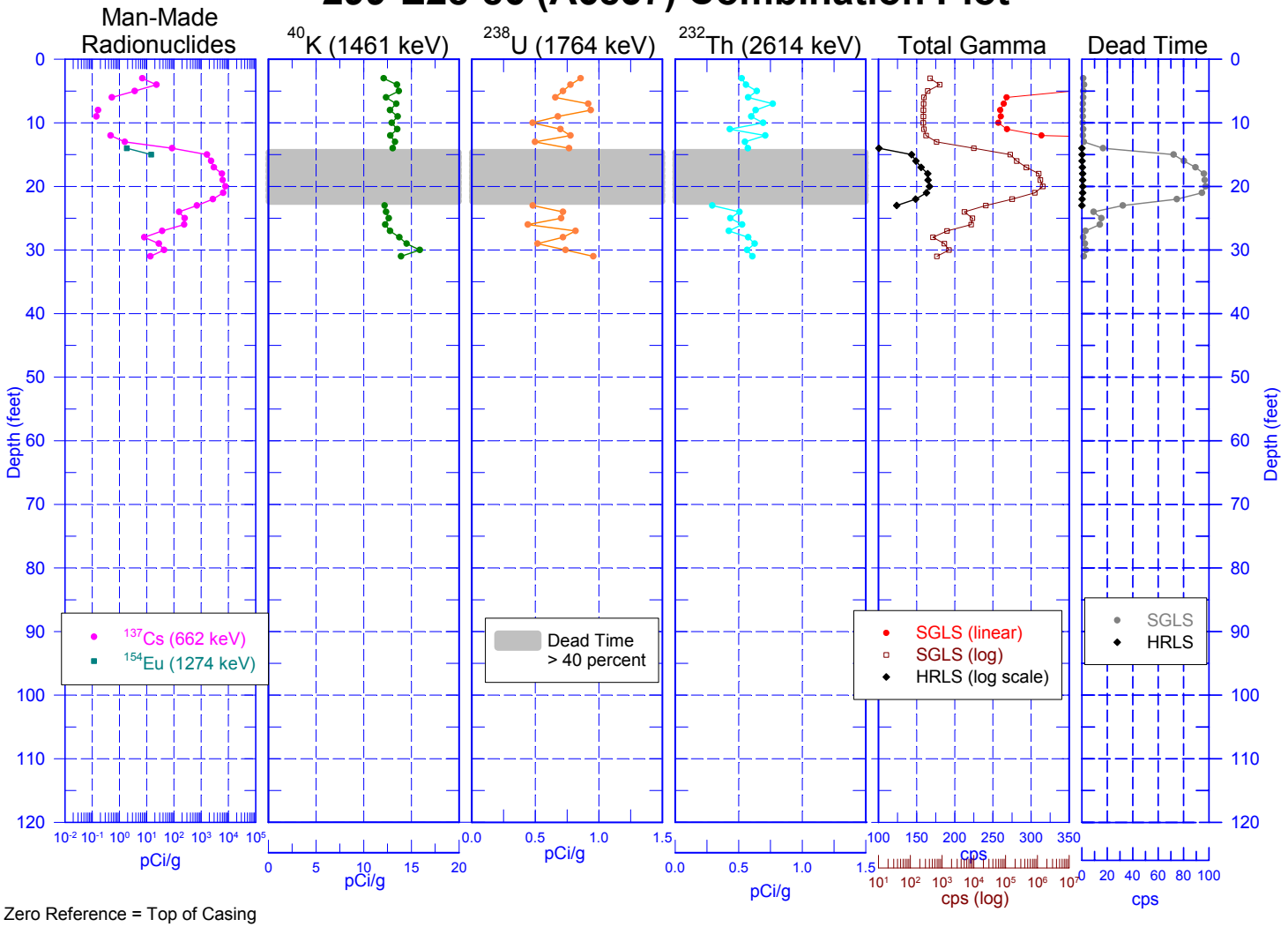
Zero Reference = Top of Casing

299-E28-86 (A6837)
Natural Gamma Logs



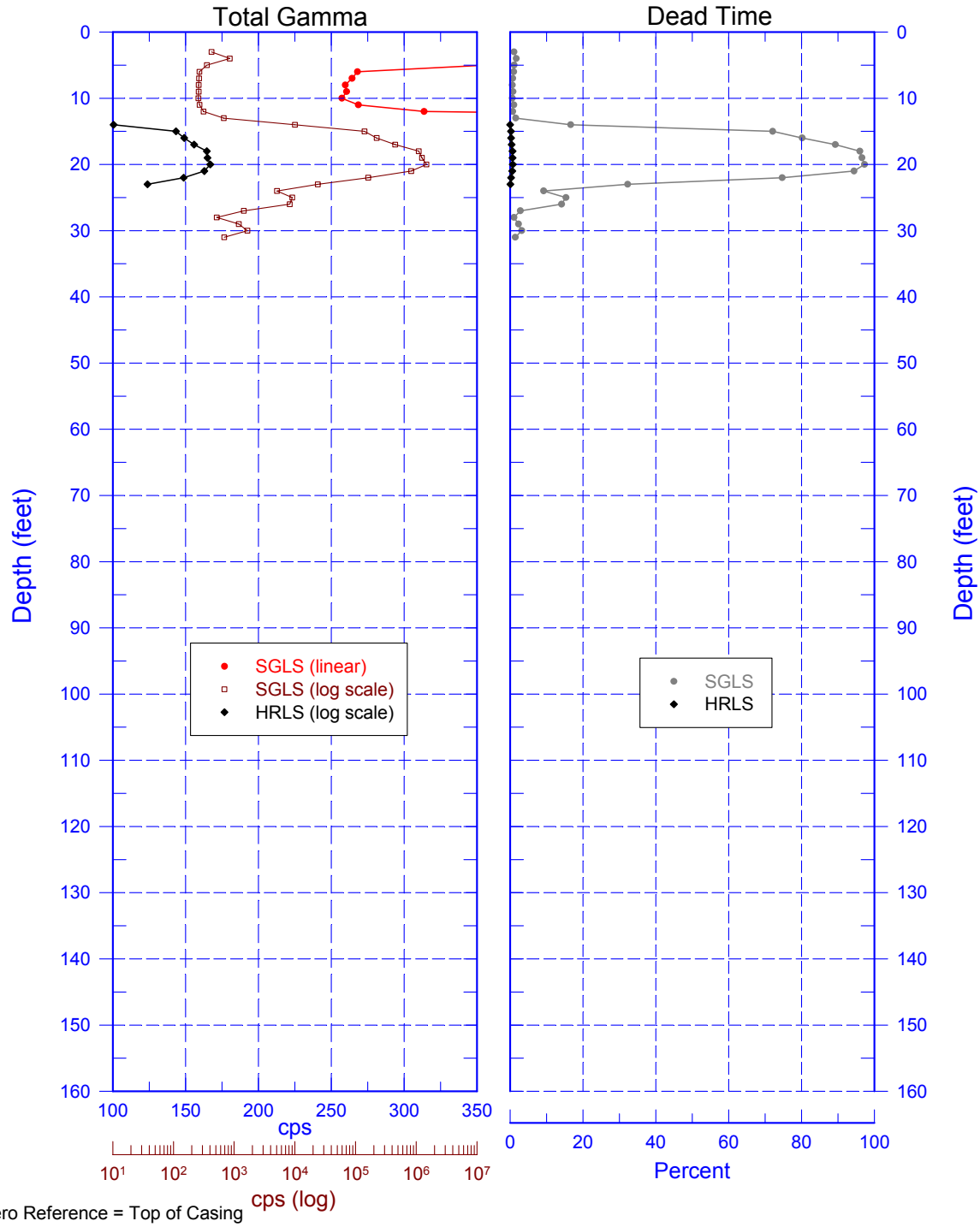
Zero Reference = Top of Casing

299-E28-86 (A6837) Combination Plot



Zero Reference = Top of Casing

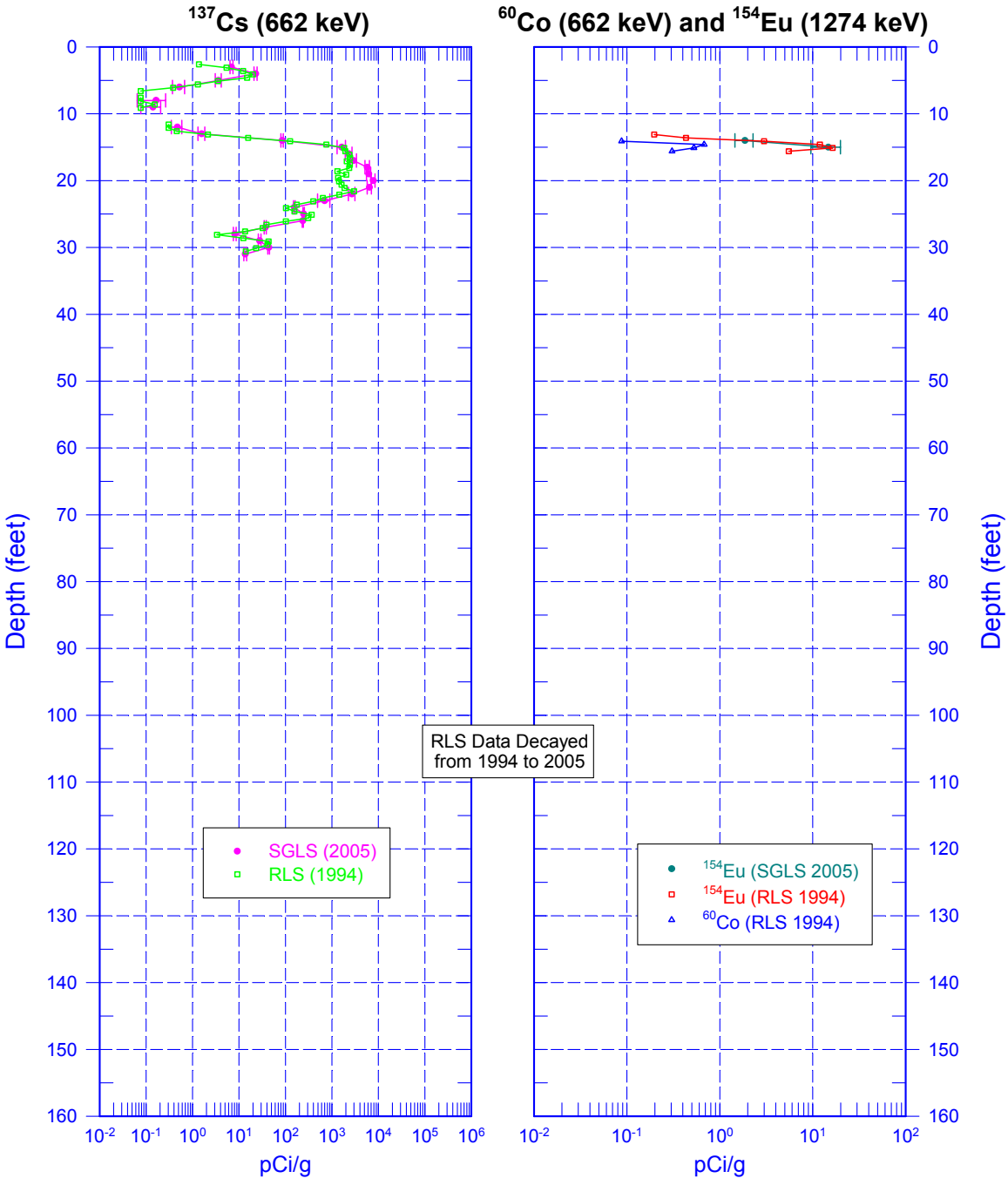
299-E28-86 (A6837)
Total Gamma & Dead Time



Zero Reference = Top of Casing

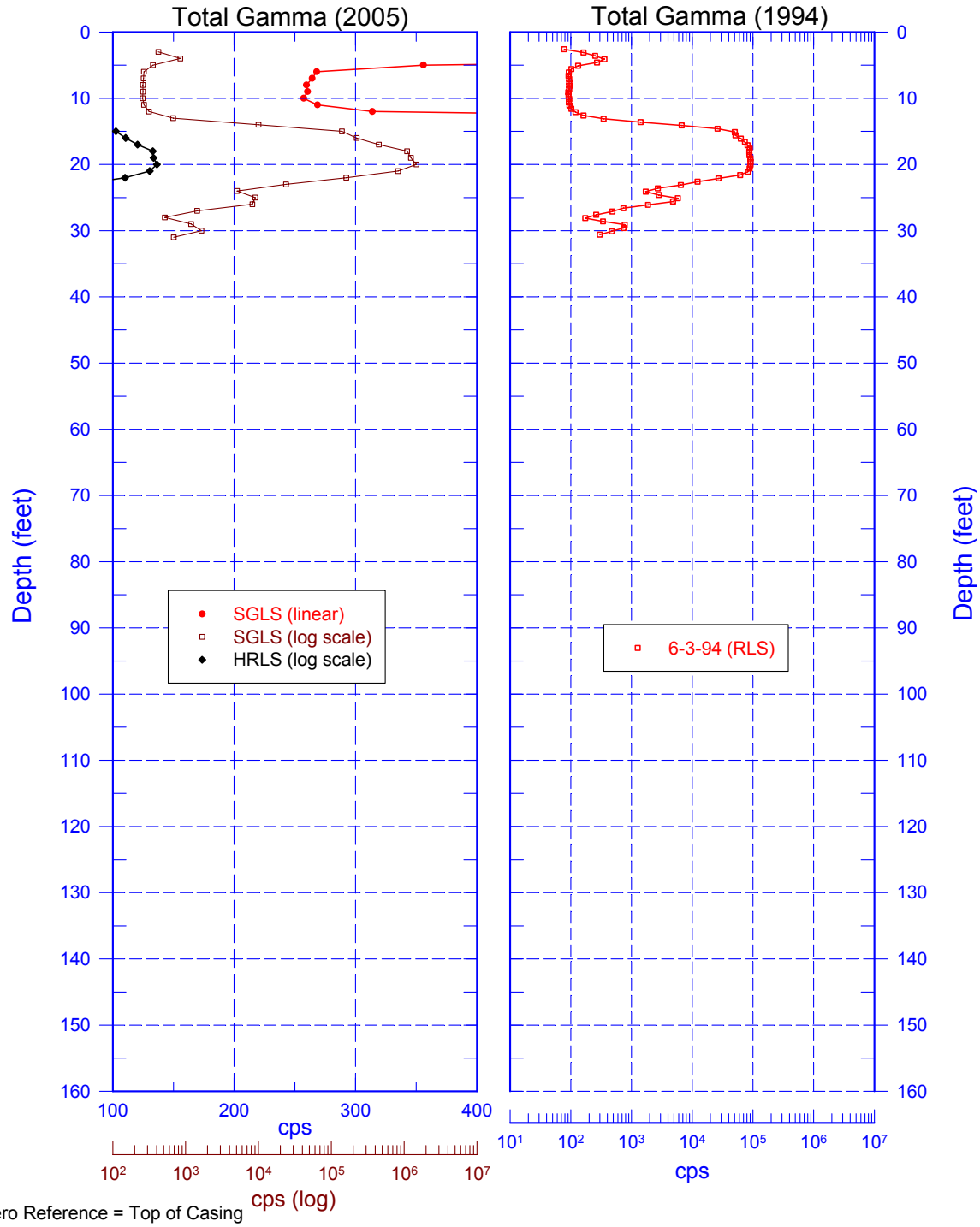
299-E28-86 (A6837)

SGLS & RLS Man-Made Comparison



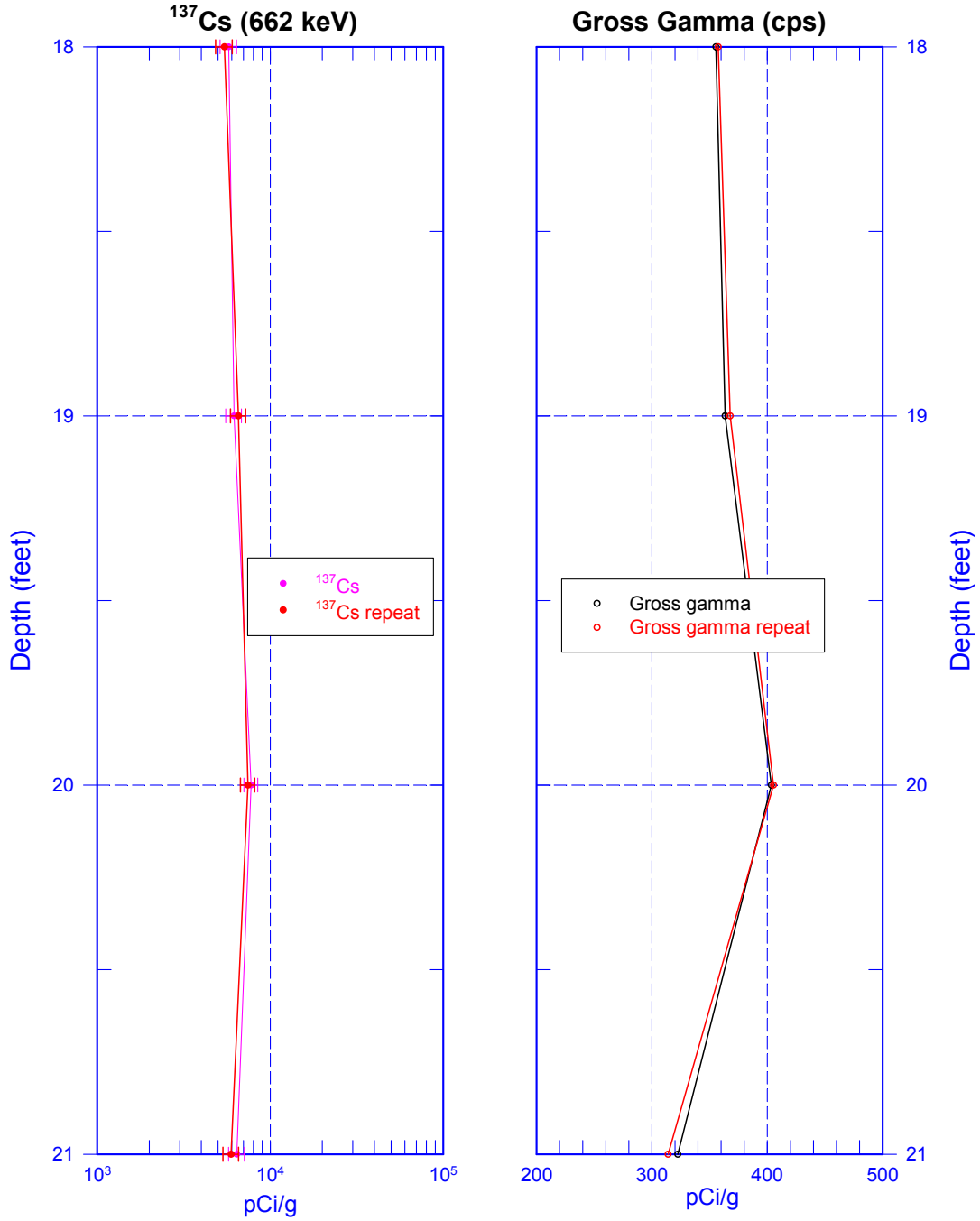
Zero Reference = Top of Casing

299-E28-86 (A6837)
Total Gamma Logs



Zero Reference = Top of Casing

299-E28-86 (A6837)
HRLS Repeat Section



Zero Reference = Top of Casing